National Aeronautics and
Space Administration
Goddard Space Flight Center

NOAA-M

National Oceanic and
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NOAA-M is the latest in the advanced TIROS-N (ATN) series. The spacecraft will broadcast data directly to thousands of users around the world and continue to provide a polar-orbiting platform to support the environmental monitoring instruments for imaging and measurement of the Earth's atmosphere, its surface, and cloud cover. Observations include information about Earth radiation, sea and land surface temperature, atmospheric vertical temperature, water vapor, and ozone profiles in the troposphere and stratosphere.

Measurement of proton and electron flux at orbit altitude, remote platform data collection, and the Search and Rescue Satellite-aided Tracking system (SARSAT) are also supported. Additionally, NOAA-M will be the third in the series to support a new suite of dedicated microwave instruments to generate improved temperature and moisture profiles and surface and hydrological products in cloudy regions where visible and infrared instruments have decreased capability.

Since the 1960s, NASA and NOAA have been actively engaged in a cooperative program to develop and launch the NOAA Polar Operational Environmental Satellites (POES). NASA's Goddard Space Flight Center in Greenbelt, Maryland, is responsible for the construction, integration, and verification testing of the spacecraft, instruments, and unique ground equipment. The U.S. Air Force provides the Titan II launch vehicle. NASA checks out the satellite on-orbit performance to assure it meets its requirements. NASA turns operational control of the spacecraft over to NOAA after a comprehensive subsystem checkout.

NOAA is responsible for program requirements funding and the on-orbit operation of the multi-satellite system. NOAA also determines the need for satellite replacement. NOAA designs and develops the ground system needed to acquire, process, and disseminate the satellite data.

These spacecraft monitor the entire Earth, providing atmospheric measurements of temperature, humidity, ozone and cloud images as they track weather patterns that affect the global weather and climate. The satellites send millions of global measurements daily to NOAA's Command and Data Acquisition stations in Fairbanks, Alaska, and Wallops Island, Virginia, and to its data processing center in Suitland, Maryland, adding valuable information to forecasting models, especially for ocean areas, where conventional ground-based data are lacking. Since 1982, the Search and Rescue Program is credited with saving more than 13,000 lives by detecting and locating emergency beacons from ships, aircraft, and people in distress.

Currently, NOAA has two operational polar orbiters: NOAA-16, launched in September 2000, into a 2:00 p.m. local solar time orbit and NOAA-15, launched in May 1998, into a 7:30 a.m. local solar time orbit. NOAA-M will replace NOAA-15 in a 10:00 a.m. local solar time orbit. The new 10:00 a.m. orbit will allow NOAA-M to carry the same instruments as the 2:00 p.m. satellite (both cross the equator two hours away from noon), and allows for the generation of the same product suite from each orbit.

NOAA-M is scheduled to be launched in the summer of 2002 will be renamed NOAA-17 after achieving orbit. The satellites receive a letter designation while under construction on the ground and are then renamed with a numerical designation after launch. This is done because the satellites are built in alphabetical order but are not necessarily launched in this same order. Therefore, to avoid confusion, they are numbered upon reaching orbit.

NOAA-M will operate in a circular, near-polar orbit of 450 nautical miles (833 kilometers) above the Earth with an inclination angle of approximately 98.67 degrees to the Equator. The NOAA-M orbit period, which is the time it takes to complete one orbit of the Earth, will be approximately 101.35 minutes.

The POES spacecraft serve as complementary satellites to the geosynchronous Geostationary Operational Environmental Satellites (GOES) system. Where the GOES satellites provide near-term data from the continental United States and Hawaii to NOAA's forecasters, the polar-orbiting spacecraft provide full global data for short-, medium- and long-range forecast models, climate modeling, and various other secondary missions.

More information on the POES program can be found on the Internet at:
http://poes.gsfc.nasa.gov and at
http://www.osd.noaa.gov/POES/index.htm

For the Classroom

One of the most vital tools scientists use to study the atmosphere is remote sensing. In this "long distance seeing" that will be performed by NOAA-M, researchers will use infrared, microwave, and visible spectral data to trace weather patterns and to image cloud cover. To be effective and provide the most accurate results, remote sensing must be performed over a long period of time. NOAA-M will collect data for at least two years and probably longer.

Why must these investigations be so comprehensive and continue for a long period of time? Try this investigation to find out.

Materials Needed:

Notebooks, pencils, paper, graph paper, if available, an instant camera or video camera, with film or videotape

Procedure:

Count the number of students at a central location in your school cafeteria or gym for a 1-minute period several times a day. You can do this by taking a photograph of the cafeteria or gym or by stationing yourself there and counting the number of students that you see. Draw a graph with the times shown on the horizontal axis and the numbers of students on the vertical axis.

Questions:

1. Is there a noticeable difference in numbers of students at various times?
2. Could you make accurate statements about how many students use the cafeteria or gym by looking at the results of only a single observation?
3. What does this tell you about the need for long-term observations from space?

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